

## NEGOTIATED RULE MAKING AS A RESOURCE AND VISITOR MANAGEMENT TOOL

A case study in the use of FACA

By LINDA CANZANELLI AND MICHAEL REYNOLDS

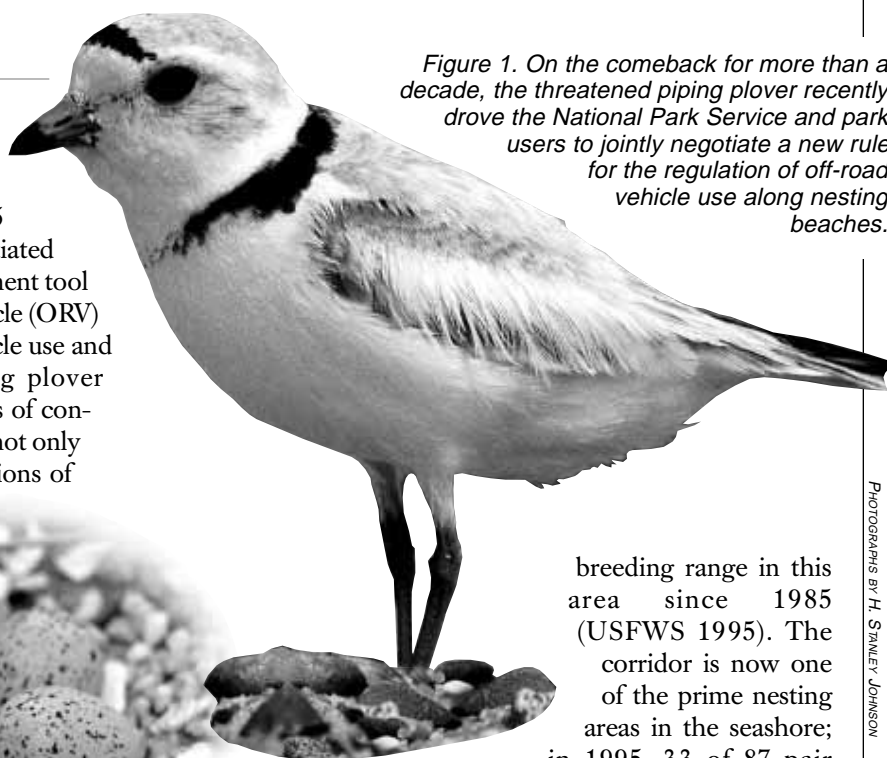
**C**APE COD NATIONAL SEASHORE, Massachusetts, recently tried *negotiated rule making* (per FACA, the Federal Advisory Commission Act, P.L. 92-463, 5 U.S.C. App. II Sec. 9(c), and the Negotiated Rulemaking Act, 5 U.S.C. Sec 561-570) as a management tool to resolve an ongoing contentious issue—off-road vehicle (ORV) use on the national seashore beaches. Off-road vehicle use and management of the federally threatened piping plover (*Charadrius melodus* [fig. 1]) has led to over 15 years of controversy, litigation, and different proposed rules that not only attempted to allow ORV access, but also close sections of beach for the plover in compliance with the Endangered Species Act.

### BACKGROUND

In 1981, the seashore proposed a new ORV regulation that slightly reduced ORV use. Unsatisfied with the regulation, environmental groups challenged this proposed rule in court. The result was a rewrite of the regulation to what is called the “1985 regulation” (36 CFR 7.67). Environmental groups also challenged this regulation in court, but it was upheld.

The National Park Service would have been content with the 1985 regulation, which established a 13.6-km (8.5-mi) ORV corridor on the 64 km (40 mi) of outer beach within the park (fig. 2, page 16), except that the piping plover has quadrupled its

Figure 1. On the comeback for more than a decade, the threatened piping plover recently drove the National Park Service and park users to jointly negotiate a new rule for the regulation of off-road vehicle use along nesting beaches.



breeding range in this area since 1985 (USFWS 1995). The

corridor is now one of the prime nesting areas in the seashore; in 1995, 33 of 87 pair

nested in the corridor

(Hoopes 1996). Primarily because of plovers in the corridor, seashore staff monitor every bird, nest, and egg daily to assess if the corridor should be closed or reopened to ORVs. As soon as a nest is identified, symbolic fencing is erected with true enclosures put up once the four eggs are laid; the ORV corridor is closed from the time the birds hatch until they fledge approximately 28 days later. During the past couple of years, on especially busy weekends such as the Fourth of July, we have only been able to open 0.6-1.0 km (0.4-0.6 mi) of the corridor (Hoopes 1996).

*Continued on page 16*

# PARK SCIENCE

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## IN THE NEXT ISSUE. . .

*Our look back at the first class of natural resource management trainees in 1984 will finally be featured next issue. Also, bald eagle surveys at Apostle Islands National Lakeshore, Wisconsin; the leave-no-trace camping ethics program; turfgrass research and use in eastern parks; and the successes and pitfalls of maintaining a water quality monitoring program at Sleeping Bear Dunes National Lakeshore, Michigan.*

## MANAGING CHANGE

If not for change, we would have nothing to do. As resource managers, we spend most of our time trying to avoid change (of the resources) or bring it about. As scientists, comprehending change, investigating its causes, and determining options for dealing with it is paramount.

This issue features several articles that deal with change. One story examines the dynamic relationship between the NPS and the National Biological Service in the quest for research in support of resource management. The cover story on FACA demonstrates a recent management tool that integrates all park users more thoroughly into park planning.

Economic assessments are not new, but their slow proliferation in park management represents a change in the past decade. As two stories point out, economic assessments may help parks begin to see themselves as some park neighbors do—as sources of economic benefit. More importantly, park neighbors may relate the jobs and income derived from the park to the enduring nature of the resources themselves.

Finally, a pair of articles describes outcomes of the December ecosystem management workshop in Tucson. Managers can expect to see published in the coming year a compendium of scientific ecosystem management case studies that may help them adopt management practices pioneered elsewhere. Managers can also expect an era of change associated with taking this endeavor seriously. In this age, the story on page 15 asserts, human influences on park natural resources are undeniable and *natural process management* alone may no longer be adequate to care for natural resources.

This assessment is timely as the NPS begins to reexamine its natural process management philosophy. Often incorrectly called the “natural regulation” paradigm, the policy states that managers “will try to maintain all the components and processes of naturally evolving park ecosystems....” Its application in wildlife management has been hotly debated for decades, especially in parks where herd sizes of large mammals have been allowed to fluctuate naturally within park boundaries. The NPS will address this philosophy, and the criticism regarding its application, in a series of scholarly, collegial forums to be held in conjunction with several national science conferences over the next 2 years. The first will be Aug. 13 in Rhode Island (see Meetings of Interest on page 32) at the annual conference of the Ecological Society of America.

Many contend that the policy is not flawed, that how it is applied is what needs careful scrutiny. The upcoming review will examine the appropriateness of the policy, given the complexities of natural resource management today, and its application in three case studies: large mammals in Yellowstone, moose and wolf in Isle Royale National Park, and white-tailed deer in eastern U.S. parks. The forums will focus on the current and emerging science and the related human dimensions surrounding these case studies to set the direction of future park management.



## Park Science Now Online

*Park Science* is now featured on the World Wide Web at “<http://www.aqd.nps.gov/nrid/parksci>.” The home page describes the publication, the issues available online, article submission criteria, and instructions on how to download individual editions in portable document format (PDF) for subsequent viewing and printing. The web site also features an interactive article index that can search for a citation by keyword, park, title, or author, describes how to obtain back issues of the publication, and provides a simple way to get in touch with the editor. Give it a whirl.

## Park Science Hard Copies Sought

The editor would like to bind several complete sets of *Park Science* for use as a reference. Needed are two copies of 7(4)—summer 1997. Additional reference sets can be bound if readers would care to donate an entire catalog of issues; most needed are complete sets of volumes 1-12. If you can be of help, please contact the editor (see page 2 for contact information).

## Natural Resource Publications Program on Hold

As a result of restructuring, the former Natural Resources Publication Program is on hold indefinitely pending funds to hire a publications coordinator. Authors interested in submitting materials suitable for publication in the familiar Monographs, Natural Resource Report, and Technical Report

Series will need to find other avenues for publication. Annual Science Reports, the Proceedings Series, and Highlights in Natural Resource Management have been discontinued; data from previously published Annual Science Reports is still available from the Investigators Annual Report database. A new report, described in the following article, will be initiated this year by the Natural Resource Information Division. *Park Science* will continue to be published.

Parties interested in receiving copies of reports may want to initially contact the authors of the respective reports. Alternatively, the NPS Technical Information Center (TIC) maintains copies of all NPS technical reports and drawings including all natural resource reports. For a fee they will make photocopies or microfiche copies of requested NPS reports for interested readers. Contact them at: Technical Information Center; National Park Service; P.O. Box 25287; (DSC-MS-TIC); Denver CO 80225-0287; through NPS cc:Mail at: “TIC- work orders/requests”; or by e-mail at: “[tic\\_work\\_orders/requests@nps.gov](mailto:tic_work_orders/requests@nps.gov)”.

## New Natural Resource Report Needs Your Input

The Natural Resource Information Division of the NPS Natural Resource Program Center has begun preparing a new and comprehensive report aimed at building *outside* support for NPS natural resource preservation goals. Tentatively titled, *Natural Resource Year in Review*, the report will be published in early 1997 and will track the highs and lows of

*Continued on page 4*

natural resource management in the National Park Service during 1996. An easy-to-read, magazine-format publication, the report will relate stories of immediate interest, informing readers of the status of significant local and national natural resource issues. The report will be based in science, but written for a general audience that includes Congress, the public, and cooperators.

To be truly national in character, the report needs widespread input. Its contents will be developed with an eye toward comprehensive coverage of major and other current events, science and resource management happenings, and national and local issues that have a bearing on the state of the art of resource preservation in the national park system. *Park Science* editor Jeff Selleck is the editor-in-chief for the project and is now soliciting article ideas and editorial assistance.

## Article ideas

Readers are invited to submit brief ideas for articles that relate to issues that are significant for both a park and the national park system this year. These synopses may be informal at this stage, but try to capsule the central issue, problem, or resource management technique and describe how it relates to progress or lost ground in preserving national park system natural resources. Selected article ideas will be developed fully in the fall with the help of an editorial board and park authors. Following are two examples of what the editor is looking for now:

## A local issue with broad implications—

Brucellosis, a bovine disease causing fetal abortions in cattle, is carried by Yellowstone bison. For

more than a decade, park scientists, local citizens, and state veterinarians have debated the threat of disease transmission from wild, free-ranging bison to nearby cattle. In 1995, after years of controversial bison removals while government agencies tried unsuccessfully to come to agreement on a mutually acceptable bison management plan, Montana sued the National Park Service to try to speed resolution of the issue. The situation brings the lack of consensus concerning the NPS practice of managing for natural processes into question. The bison management debate necessarily requires the National Park Service and its neighbors to face the often conflicting social, economic, and political factors that influence natural resource management issues.

## A national issue—

Since 1991, the network of long-term air quality trend monitoring stations has shrunk from 42 to 34 in class 1 airshed parks. Increasing operational costs without accompanying budget increases accounted for these shut downs and also resulted in suspension of baseline monitoring in other parks. These developments make it unlikely for the National Park Service to meet its goal of establishing baseline ozone and SO<sub>2</sub> levels in each of the 48 class 1 airshed parks by the year 2,000. Further reductions in the long-term monitoring network likely will continue as a result of government downsizing.

Forward your ideas to *Park Science* editor Jeff Selleck (see the bottom of the left column on page 2 for contact information) by e-mail, regular mail, or telephone as they come to mind.

## Volunteers for advisory board

The editor is also interested in establishing an editorial board for article evaluation and development. If you are interested in serving on an editorial board and would have a few days this fall that you could devote to discussing the merits of the article ideas, prioritizing them, suggesting full treatment outlines for the articles, and

possibly writing, please contact the editor. Editorial business will be conducted over e-mail and the telephone, rather than by travel. The editor would like representatives from a broad array of perspectives, including parks (park management, resource management, law enforcement and visitor protection, interpretation, and maintenance divisions), the Natural Resource Program Center, the Office of the Associate Director for Natural Resource Stewardship and Science, and partners.

## Deadline

Please submit your preliminary article ideas and indicate your interest in serving on the editorial board by August 30.

## In Closing

The *Natural Resource Year in Review* is an exciting prospect. It has the potential of unifying disparate stories from around the country into one message about the NPS role in the welfare of our treasured natural resources. While park visitors and political representatives alike flock to national parks to enjoy their grandeur, they may not understand as well or support as fervently the efforts of natural resource managers and scientists to maintain the health of the parks. The *Natural Resource Year in Review* will address this disconnect. Please give it your support.

## Research Grants Available From the Center For Field Research

The Center for Field Research invites proposals for 1997 field grants awarded by its affiliate Earthwatch. Earthwatch is an international, non-

profit organization dedicated to sponsoring research and promoting public education in the sciences and humanities. Grants range from \$10,000 to \$100,000. Most of the funds contributed to the research projects come from the donations of Earthwatch members, who enlist for the opportunity to join scientists in the field and assist them with their data collection and other research tasks. Thus, nonspecialist volunteers must be integrated into the research design.

In 1996, The Center for Field Research made grants to several projects that had a direct bearing on national park sites: Resource Management Specialist John Roth researched cave formations and macro-invertebrate baselines at Oregon Caves National Monument, Oregon; NBS Research Scientist Judd Howell studied wildlife habitat relationships in Golden Gate National Recreation Area, California; Michigan Technological University Professor Rolf Peterson continued to look at moose-wolf ecology, and specifically the role of wolf predation, at Isle Royale National Park.

Information about Earthwatch field grants is available on the center's World Wide Web site (<http://gaia.earthwatch.org/WWW/gfr.html>) or you can contact: Dr. Andy Hudson, Director, The Center for Field Research, 680 Mt. Auburn Street, Watertown, MA 02172. Telephone (617) 926-8200; fax (617) 926-8532; e-mail "ahudson@earthwatch.org" or Sean Doolan, Science Officer, Earthwatch Europe, Belsyre Court, 57 Woodstock Road, Oxford OX2 6HU, United Kingdom. Telephone: (865) 311 600; fax (865) 311 383; e-mail "ewoxford@vax.oxford.ac.uk".

## SCIENCE AND ECOSYSTEM MANAGEMENT IN THE NATIONAL PARKS

A Timely Book by William L. Halvorson and Gary E. Davis

By WILLIAM L. HALVORSON

**S**CIENCE AND ECOSYSTEM *Management in the National Parks* (ISBN 0-8165-1566-2) underscores that our national parks are more than recreational pleasuring grounds. They are repositories of the nation's biological diversity and contain some of the last ecosystem remnants needed as standards to set reasonable goals for sustainable development on a landscape basis. In the past, public pressure for recreation largely precluded adequate research and resource monitoring in national parks, and ignorance of ecosystem structure and function in parks lead to costly mistakes—such as predator control and fire suppression—that continue to threaten parks. This book demonstrates the value of ecological knowledge in protecting parks and shows how modest investments in knowledge of park ecosystems can pay handsome dividends.

Sponsored by the NPS Inventory and Monitoring (I&M) Program and recently published by the University of Arizona Press, this book presents 12 case studies of long-term research conducted in and around national parks. These case studies were chosen by a panel of NPS scientists and senior managers to address major natural resource issues. The cases show how the use of longer time scales strongly influence a manager's understanding of ecosystems and how interpretations of short-term patterns in nature often change when viewed in the context of long-term data sets. Most importantly, the cases illustrate conclusively that scientific research significantly reduces uncertainty and improves resource management decisions.

The cases offer a broad range of topics, including air quality at Grand Canyon National Park, Arizona, the moose and wolf interaction at Isle Royale National Park, Michigan, alien species at the Ha-

waiian parks, fire management in the Sierra Nevada (California and Nevada), and the impact of urban expansion on Saguaro National Park, Arizona.

Because national parks are increasingly beset with conflicting views of management, the need for knowledge of park ecosystems becomes even more critical with time—not only for the park units themselves, but for what they can tell us about survival in the rest of the world. This book demonstrates to policy makers and managers that decisions based on knowledge of ecosystems are more enduring and cost effective than decisions derived from uninformed consensus based on belief. It also provides scientists with models for designing research to meet threats to our most precious natural resources.

The I&M Program of the National Park Service was designed in 1992 as a phased program that would eventually include fairly complete resource inventories for some 262 national park system units with significant natural resources. To complete this work over the target 10-year life of the program, the National Park Service planned for annual funding increases that were projected to reach \$20,000,000 by 1996 and \$26,000,000 in the program's final year. Instead, though most agree with the importance of inventory and monitoring, the program dawdles along at about \$6,000,000 annually. The importance of ecosystem level information, demonstrated so well by this book, has

not yet been accepted by those that have the responsibility for providing guidance and funds.

The book has been sent to the inventory and monitoring parks, system support offices, field area offices, and the Washington offices of the National Park Service and National Biological Service. It is my hope that this volume will help bring added awareness and impetus to this seriously needed program.

**P**

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*Marine Biologist at Channel Islands National Park, California; phone (805) 658-5707.*



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## ROCKY MOUNTAIN

### Bear Attractant Test of Biodiesel Fuel

In 1994, over 3 million visitors toured Yellowstone National Park, Wyoming. Along with NPS and concessioner vehicles, park visitor vehicles burned over 28.8 million liters (7.6 million gallons) of gasoline and diesel fuel in the park. Pollution from vehicle emissions can have harmful effects on both animal and plant life. In cooperation with the Montana Department of Natural Resources and Conservation and the U.S. Department of Energy, Pacific Northwest and Alaska Regional Bioenergy Program, Yellowstone is participating in a pilot project to evaluate the use of 100% *rape ethyl ester* (*biodiesel*) as a low pollution alternative to diesel fuel in environmentally sensitive areas.

Biodiesel emits fewer hydrocarbons and particulates than fossil-based fuels and is derived from renewable resources. It contains negligible levels of sulfur and reduces emissions of sulfur dioxide, one agent responsible for acid rain. Biodiesel is part of the natural cycle (i.e., assimilation of CO<sub>2</sub> by plants for growth and development), and could lead to zero-net-gain in oxides of carbon emissions. The fuel is biodegradable and quickly breaks down, preventing long-term damage to soil or water if spilled.

Yellowstone preserves pristine wildlife habitat and is a premier wildlife viewing park. On occasion, animals, such as grizzly and black bears, may come into close proximity with humans. Biodiesel fuel is a vegetable oil derivative that smells like cooking oil. The exhaust from a biodiesel fueled engine smells similar to a french fry

cooker and could attract bears. If bears were attracted to biodiesel powered vehicles, they could be drawn into park developments and roadside corridors resulting in increased bear-human conflicts (human or bear injuries and property damage). This could lead to potential removal of grizzly and black bears from the population. Concerned with this potential, the park conducted tests to determine if raw biodiesel fuel or its emissions were bear attractants.

As part of the tests, bears were exposed to ambient air, odor from raw biodiesel fuel, raw diesel fuel, a deer meat and dog food mix (known attractant), biodiesel exhaust, and diesel exhaust. Of five captive grizzly and five captive black bears tested, none displayed an attraction to ambient air and all displayed a significant attraction to the deer meat and dog food. All bears were indifferent to biodiesel and diesel fuel, but became agitated and aggressive when exposed to the exhaust from these two fuels.

Available at \$8 per gallon, biodiesel is not presently a feasible alternative to gasoline and common diesel fuels. Because its use also requires a minor modification to fuel tanks, biodiesel is best suited to individual vehicle fleets, such as those operated by the park and its concessioners. Yellowstone plans to continue field testing the fuel and may be able to increase its use in more park and concessioner vehicles as biodiesel becomes more economical.

For more information on the experiment, contact Mark Biel, Kerry Gunther, or Hopi Hoekstra of the Yellowstone

Bear Management Office at (307) 344-2162; e-mail "k\_gunther@nps.gov."

• • •

### More Wolves for Yellowstone

Project biologists released 17 gray wolves in Yellowstone this past winter and early spring as a second phase of the wolf restoration efforts begun there last year. The 11 females and 6 males ranged in age from 9 months to 5 years, weighed between 72 and 130 pounds, and came from 6 packs in British Columbia. In April, following 10 weeks in acclimation pens, the wolves were released and joined 18 wolves already living in and around the park from similar releases in 1995.

The releases came after the late February through early March breeding season in the hopes that the wolves would den in April or May. Acclimated and released in four different areas of the park, two of the four packs scattered. Several wolves wandered to the Gallatin Range northwest of the park. A pregnant female appears to have denned in the Custer National Forest in Montana. Others from her group remained in the park, wandered to the Gallatin National Forest west of the park, and moved to Shoshone National Forest east of the park. A second known pregnant female, carrying six pups, died of hot spring water burns near Old Faithful; her mate remained in the south-central part of the park following her death. Five wolves released near Rose Creek in northern Yellowstone have generally remained in the park in the upper Slough Creek drainage.

Last year's releases of 14 wolves resulted in the birth of nine pups from two packs. Altogether, five wolves have died. A Red Lodge, Montana, man was convicted of killing a male wolf and given a 6 month prison sentence and \$10,000 fine. Animal damage control agents dispatched a wolf north of the park after determining that it had preyed on sheep on two separate occasions. The final rule for managing the restored wolves provides for their removal in the event of livestock depredations, and the project biologists and cooperating agencies felt this action would most likely benefit the overall recovery effort. Defenders of Wildlife compensated the ranchers for their livestock losses. Two additional wolves have been shot outside the park in Wyoming. In one case, a rancher turned himself in to authorities when he realized he had mistakenly killed a wolf during a coyote hunt in calving season. Cooperative throughout the investigation, the man was fined \$500. The other perpetrator is still at large. The fifth wolf was hit by a vehicle within the park.

Despite these setbacks, the restoration effort is generally thought to be going well. Three of the six original wolves from the Crystal Creek Pack remain generally in the Lamar and Pelican Valleys in the park; winter visitors reported seeing them chase and feed on elk. The Rose Creek Pack stays mostly in the Slough Creek and Hellroaring areas in the park. Last fall, the alpha female and her seven surviving pups were joined by a young male, formerly of the Crystal Creek Pack, who has now become the alpha male. The Soda Butte Pack ranges along the northern front of the Beartooth Mountains and in

upper Slough Creek inside and outside the park. By late April, biologists noted signs that the alpha females from all three of these packs, and possibly some of the newly released packs, were denning.

Especially exciting is news that a male and female from two different 1995 release areas have paired, comprising the first naturally forming wolf pack in Yellowstone in more than 60 years. The pair has mated, appears to have denned, and could have a litter by summer.

## GREAT PLAINS

### Resolving "A (Fish?) Bone of Contention"

The Arkansas Game and Fish Commission began stocking catfish in the Buffalo River in 1951, long before the establishment of Buffalo National River in 1972. Continuing this practice after park establishment, the Game and Fish Commission has introduced an estimated 1.4 million fish of several species in the past 50 years. In 1988, the stocking issue became contentious when the National Park Service requested the commission to cease stocking catfish in the Buffalo River until adequate scientific data could be collected to assess the effects and results of stocking.

The National Park Service had a serious situation to address. The Game and Fish Commission considered the Buffalo River a *put-and-take fishery* and had a limited concept of NPS fisheries policy. The public was outraged at a misinterpreted newspaper statement

attributed to park staff that "catfish probably never existed in the Buffalo River anyway." During this process the park lacked expertise in fisheries management to resolve many of the issues with the state biologists.

How were we to resolve this "bone of contention" as the Game and Fish Commission director described the issue? The park staff attacked the problem on three fronts: holding direct and informal discussions with state biologists, conducting joint fisheries research projects directed at the issue, and developing a cooperative fisheries management plan for the river.

We began by inviting a cadre of NPS, Forest Service, and U.S. Fish and Wildlife Service fisheries biologists to come to the park and develop goals, objectives, and an outline for a fisheries management plan. The resulting draft document was then pre-

review. We also engaged in discussions with the Game and Fish Commission regarding other issues and projects that helped to open dialog and promote better understanding of our mission.

Many benefits accompanied this approach to conflict resolution. Communication between us and the state improved, leading to cooperative projects in other areas of wildlife management. We had access to more complete expertise that the park lacked on its own. Most recently, a Game and Fish employee has been assigned to an interagency liaison post within Buffalo National River headquarters.

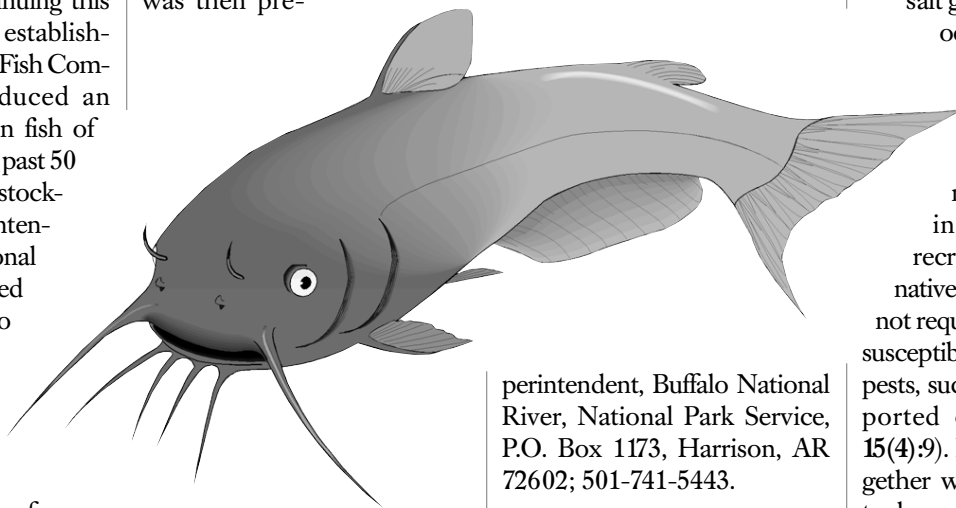
The resulting fisheries management plan has served as a nationwide NPS model of a warm water fisheries management plan. Copies are available upon request. Contact the Su-

bored many hours removing exotic, herbaceous weeds from landscaped areas within the park. The difficult task reduced the exotics, giving the native coastal plants a chance to come back in these areas. Funding constraints and the desire to explore an alternative to commercial herbicides caused resource managers to consider using a salt water treatment of the exotics on a trial basis; native plants are considered to be salt-tolerant, while exotic weeds are not.

The park tested an initial study plot 5 m x 5 m (16 ft x 16 ft) in size. Staff applied salt spray to the exotics by attaching a pump to a transportable water tank. Applications thoroughly soaked the area and were repeated within 3 weeks of each other. After just two applications, not only did the exotic vegetation die back, but a natural recruitment of the native salt grass (*Distichlis sp.*) also occurred.

As a result of the test, the park will use the salt spray method as an alternative to costly weeding, and as a way to recruit low maintenance native grasses. Salt grass does not require mowing and is not susceptible to many turf grass pests, such as chinch bugs (reported on in *Park Science* 15(4):9). Native salt grasses together with natural pest controls are low maintenance, ecologically sound environmental choices.

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perintendent, Buffalo National River, National Park Service, P.O. Box 1173, Harrison, AR 72602; 501-741-5443.

## GULF COAST

### Salt Spray Alternative to Weeding

In the hot and humid summer months of years past, resource managers at Biscayne National Park, Florida, have la-

## New Journal Dedicated to Wilderness

The *International Journal of Wilderness*, the only journal to focus on wilderness issues worldwide, published its first edition last fall with contributions from around the world. Articles include new research findings, wilderness strategies, inspirational features, commentary, and reviews. The journal is designed to link professionals, scientists, and the public in a worldwide forum for discussing wilderness research, planning, management, education, and practical experience. John Hendee, Director of the University of Idaho Wilderness Research Center, is the managing editor. The National Park Service is one of 18 leading wilderness management organizations that has sponsored the new publication.

Subscriptions run \$30 for individuals and \$50 for organizations and libraries per calendar year; Canadian and Mexican subscriptions cost an additional \$10. Outside North America add \$20. To subscribe, contact the International Journal of Wilderness; the WILD Foundation; 2162 Baldwin Road; Ojai, CA 93023; fax (805) 649-1757; e-mail "wild@fishnet.net". Include your name, address, city, state, zip code, country, and telephone number. For editorial communication, contact the managing editor at "wrc@uidaho.edu".

## Wild Horses and Fertility Control

Assateague Island National Seashore, Maryland, may have solved its predicament of what to do about its wild horses. Declared a desirable exotic species

in the park enabling legislation, wild horses also damage the fragile ecology of the park. Faced with the dilemma of how to control population numbers in a humane and publicly acceptable way, the park began contraception research in 1985. The outcome is a practical, relatively inexpensive, and publicly acceptable humane management tool that may have far-reaching use.

Researchers initially experimented with administering steroid hormones to reduce sperm count in males and prevent ovulation in females, but the technique did not show promise. Later, they inoculated 26 mares with an immun contraceptive vaccine (porcine zona pellucida or PZP) that was 100% effective. The glycoprotein-based vaccine produces antibodies that block fertilization and did not interfere with pregnancies in progress or social organization. After 7 consecutive years of treatment, the only effects noted were failure to ovulate and depressed estrogen concentrations; in 120 mare-years of PZP contraception, only four foals have been born. The vaccine is easily delivered remotely and a single annual booster is adequate to continue contraception.

John Karish, NPS Chief Scientist of the Allegheny-Chesapeake System Support Office, is distributing copies of the report, *Management of Wild Horses by Fertility Control: The Assateague Experience* (NPS/NRARS/NRSM-95/26), by Dr. Jay F. Kirkpatrick. Contact him at 209B Ferguson Building; University Park, PA 16802-4301; (814) 865-7974.

## Global Change Research at Mount Rainier

David L. Peterson (NBS University of Washington CPSU) and Regina M. Rochefort (Mount Rainier National Park) have published the results of a Global Change Research Program study conducted at Mount Rainier. Entitled, *Temporal and spatial distribution of trees in subalpine meadows of Mount Rainier National Park, Washington, U.S.A.*, the study began in 1991 and examined the distribution and abundance of subalpine fir (*Abies lasiocarpa*) in five locations in the subalpine zone on Mount Rainier that represent variation in geography, climate vegetation type, and landscape position. They observed that the distribution and abundance varied during the past century in response to climatic variations at the micro- and mesoscale. Recruitment on the wetter west side of the park has been fairly continuous since about 1930, but has occurred only in short, discrete periods on the dry east side. Tree establishment is successful on the west side during warm, dry summers while cool, wet summers favor establishment on the east side. Vegetation type and landscape position also affect tree establishment. This dynamic relationship indicates that climate change could have a significant and rapid impact on regeneration of this and other high-altitude tree species.

Interested readers can find the 1996 article in *Arctic and Alpine Research* 28(1):53-59; reprints are also available from Rochefort; phone (360) 569-2211, ext. 3374.

## Ferret Report Out

Biologists at Badlands National Park, South Dakota, have written a report on the black-footed ferret release program covering the period from May 1994 through September 1995. Nine chapters describe the restoration activities and include site preparation, release techniques, and post-release monitoring. Also included is the complete reintroduction protocol. A limited number of reports is available by contacting Badlands Wildlife Biologist Glen Plumb at (605) 433-2464 and asking for the report:

McDonald, P.M., P.E. Marinari, and G.E. Plumb, editors. 1996. Black-footed ferret reintroduction: Year one completion report, Conata Basin/Badlands, South Dakota. U.S. Forest Service. Wall, South Dakota. 136 pp.

## Wisconsin CPSU Web Site Worth Checking Out

The Wisconsin Cooperative Park Study Unit (University of Wisconsin-Madison) now operates a fine World Wide Web site on the Internet (<http://www.emtc.nbs.gov/wicpsu.html>). Its features presently include a list of the 1995 research projects undertaken by the CPSU in support of national park system areas of the Midwest Field Area, annotated flora references for 22 midwestern parks, searchable flora and lichens databases, and other related information.

## Natural Resource Agencies and Social Values Explored

Craig Shafer, an ecologist with the NPS Natural Systems Management Office, recently enjoyed reading two papers by

Jim Kennedy, a professor of natural resource management at Utah State University. Presently serving a stint as Special Assistant to the Director of the Bureau of Land Management in Washington, D.C., Kennedy writes about natural resource management and social values, and has analyzed the integration of technically oriented natural resource managers into agency culture in the first paper. The second paper presents the results of a survey of several thousand employees of the U.S. Forest Service, probing their perceptions of agency priorities and its reward system. The analysis gives insight into what large organizations value most and how these values can be vastly different from those held dear by employees. The two papers are:

Kennedy, J.J. and J.W. Thomas. 1991. Exit, voice, and loyalty of wildlife biologists in public natural resource/environmental agencies. Pages 221-238 in W.R. Mangun, editor. *American Fish and Wildlife Policy: The Human Dimension*. Southern Illinois Press. Carbonale.

Kennedy, J.J., R.S. Krannish, T.M. Quigley, and L.A. Cramer. 1992. How employees view the USDA-Forest Service value and reward system. Presented at the 4th North American Symposium on Society and Resource Management, School of Natural Resources, University of Wisconsin-Madison, 17-20 May 1992. Unpublished.

Kennedy has written many other papers. Although he has not yet read them, Shafer suspects these will especially interest resource managers trained in the natural sciences, for Kennedy delves into social science issues in natural resource management. They include:

Kennedy, J.J. 1991. Integrating gender diverse and interdisciplinary professionals into traditional U.S. Department of Agriculture-Forest Service culture. *Society and Natural Resources* 4:165-176.

Kennedy, J.J. 1988. Legislative confrontation of groupthink in U.S.

natural resource agencies. *Environmental Conservation* 15:123-128.

Kennedy, J.J., B.L. Fox, and T.D. Olson. 1995. Changing social values and images of public rangeland management. *Rangelands* 17:127-132.

Kennedy, J.J. and J.W. Thomas. 1995. Managing natural resources as social value. Pages 311-321 in R. Knight and S. Bates. *A New Century for Natural Resources Management*. Island Press, Washington, D.C.

Kennedy spoke at the December Tucson meeting on ecosystem management (see the article on page 13) and recently presented two training sessions to new NPS resource managers at the Albright Employee Development Center. In the near future, he will be returning to Utah State University where he has worked for 25 years. Any potential readers who can not locate the papers are encouraged to contact Kennedy himself at (202) 208-3898; fax (202) 501-6718.

## Indicators of Hydrologic Change Examined at Indiana Dunes

National Biological Service Research Scientist Doug Wilcox of the Great Lakes Science Center has published in the *Natural Areas Journal* 15(3):240-248 a paper entitled, *Wetland and Aquatic Macrophytes as Indicators of Anthropogenic Hydrologic Disturbance*. Based on work conducted at Indiana Dunes National Lakeshore, Indiana, the paper discusses how hydrologic disturbances can affect wetland and aquatic macrophyte communities by creating temporal changes in soil moisture or water depth. Such disturbances are natural; however, human-caused changes in wetland hydrology may have negative effects on wetlands. Since plant commu-

nities respond to habitat alterations, observations of plant community changes may be used to recognize effects of hydrologic disturbances that are otherwise not well understood. A number of plants, including *Typha angustifolia* (narrow-leaf cattail) and *Lythrum salicaria* (purple loosestrife), are recognized as disturbance species; they are often found in roadside ditches, in wetland that have been partially drained, or in low areas that have been flooded. Other species commonly occur on mudflats exposed by lowering of water levels. In addition, wetland shrubs and trees invade or die as a result of draining or flooding. In more subtle terms, the relative composition of plant communities can change as a result of altered hydrology. Remote sensing (photointerpretation) and field vegetation studies, coupled with water-level monitoring, are recommended for gaining an understanding of hydrologic disturbances in wetlands.

Wilcox is also the editor of *Wetlands*, a quarterly journal concerned with all aspects of wetlands biology, ecology, hydrology, water chemistry, soils and sediment characteristics, management, and laws and regulations. Subscription and article submission information is available from the Society of Wetland Scientists; phone (913) 843-1235.

## Environmental Software Described

*Environmental Software Systems* (ISBN 0-412-73730-2) by R. Denzer, G. Schimak, and D. Russell, consists of articles on software used in environmental protection and research. The book addresses the themes of

environmental information systems; modelling and simulation; environmental management; decision support; distributed environmental information; artificial intelligence applications; and environmental data visualization. Published by Chapman and Hall, 115 Fifth Ave. New York, NY, 10003, the hard copy costs \$110.50. It is 304 pages in length.

## Ecosystem Geography

Robert G. Bailey, the U.S. Forest Service senior geographer and developer of a well-known ecoregion classification system used by many land managers around the world, has published a new book. Available from Springer Verlag (800-777-4643), *Ecosystem Geography* (1995) is a landmark contribution that brings the geographers' tools—maps, scales, boundaries, and units—to the study of ecosystems. The author has distilled more than two decades of research on ecosystem mapping and classification. His work has had a growing influence on how government and academic scientists are using ecological data to monitor biodiversity, manage land holdings, and interpret the results of climatic change. *Ecosystem Geography* features spectacular graphics, including diagrams, photographs, and abundant maps. It will be welcomed by ecologists, geographers, land and resource managers, and anyone involved in the study or management of landscapes and ecosystems. The book has been released in both softcover (ISBN 0-387-94586-5; \$34.50) and hardcover (ISBN 0-387-94354-4; \$69.95), and is 204 pages long.



# THE NATIONAL BIOLOGICAL SERVICE AND NPS SCIENCE-BASED MANAGEMENT:

## Examining a static need in a dynamic relationship

By RICH BACHAND

**T**HE NATIONAL BIOLOGICAL Service (NBS) was created in October 1993 by U.S. Department of the Interior (DOI) Secretary Bruce Babbitt to provide independent and objective science for department bureaus. The agency is "to work with others to provide the scientific understanding and technologies needed to support the sound management and conservation of our nation's biological resources" (NBS Mission 1995).

In creating the NBS, most biological research, survey activities, and personnel of the eight department bureaus (U.S. Fish and Wildlife Service, National Park Service (NPS), Bureau of Land Management, Bureau of Reclamation, Minerals Management Service, Office of Surface Mining, U.S. Geological Survey (USGS), and Bureau of Mines) were combined in the new agency leaving their respective parent bureaus without an internal biological research staff. The National Park Service found itself with 183 fewer scientists and staff (Ombudsman Committee Report 1994). This coincided with the publication of the National Academy of Sciences report on *Science and the National Parks* (1992), a report that strongly urged fundamental changes in NPS structure and culture to effect a greater emphasis on scientific research in parks.

It is easy to understand how these events left NPS officials uneasy. The National Park Service had a new and clear mandate to improve the quality of its research at a time when it would lose jurisdiction of its research staff. This crossroads is where the National Park Service and its former scientists would unfold a new partnership.

### EXPERT PANEL

At the George Wright Society meeting in Portland, Oregon (April 1995), I served as chairman of a panel session entitled, "The Role of NBS in Meeting NPS Management Needs." This session provided

one of the first opportunities to explore the new alliance between the two agencies. The expert panel offered a variety of perspectives and consisted of individuals with broad expertise in park research and resource management. They included Craig Allen (Scientist-Bandelier National Monument, NM), H. Ron Pulliam (Director) and Charles van Riper III (Scientist-Colorado Plateau Research Station) from the National Biological Service; and Bob Moon (Regional Chief of Resource Management for the former Rocky Mountain Region) and Karen Wade (Superintendent-Great Smoky Mountains National Park, Tennessee and North Carolina) from the National Park Service.

With the imminent transfer of the National Biological Service to the U.S. Geological Survey, I have highlighted insightful observations made during that discussion for consideration as the former NPS science program undergoes further change. The issues discussed during that session remain pertinent to current discussions and serve as a reality check in an effort to continue providing scientific information to park managers.

### OPPORTUNITIES

Panelist Bob Moon tailored his comments to the complexities of the simultaneous creation of the National Biological Service with NPS efforts to reorganize and reinvent itself. "At the same time the Park Service is reorganizing itself, we're trying to figure out how we're going to do science with NBS." Moon saw these changing times as a chance to move forward in improving the quality and accountability of research. Although positive steps were made toward more closely tying quality research with science-based resource management, pre-NBS science conducted in house was not "the good old days," and he said "the movement still had a long way to go." Separating research from the National Park Service provided the National Biological Service with an opportunity to act independently and to

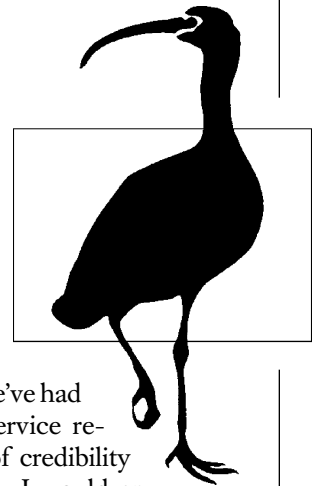
establish its credibility by providing science for management. "One of the problems we've had with past Park Service research in terms of credibility was accountability. I would encourage the NBS to build in a lion's share of accountability," Moon recounted.

### LAYERS OF REORGANIZATION

Many concerns dealt with the reorganization the National Park Service went through both before and after the creation of the National Biological Service. Moon noted that research and resource management in the NPS had been coming together (as called for in the Vail agenda). Quality research had been getting underway and lending itself to a more science-based resource management program. When the National Biological Service was created, all this forward movement came to an unexpected crossroads. The transition left the National Park Service without an internal structure for tactical research or technical assistance (it would depend on the partnership with NBS) at a time when it was going through its own reorganization. "This was a reorganization where NPS research was never part of the discussion." He quickly added that the National Park Service is still responsible for conducting research and carrying out science-based management and that the National Biological Service is an organization to help them reach this goal. Moon warned, "None of us (referring to NPS) can have the... attitude to let the NBS do it, so [that] we don't have to worry about it."

### PROGRESSIVE STEPS

The departure of park scientists to the National Biological Service greatly concerns Great Smoky Mountains National Park Superintendent Karen Wade for



# NBS-USGS Merger Update

ON MARCH 22, 1996, NBS DIRECTOR RON PULLIAM ANNOUNCED THAT THE NBS-USGS merger was in progress and would be completed on or before October 1, 1996. At that time, NBS biological science and related activities will become the Biological Resources Division (BRD), a fourth division within USGS (USGS currently consists of the Geologic Division, Water Resources Division, and the National Mapping Division).

A transition steering team composed of NBS and USGS representatives established four issue subcommittees (science, management, administration, and information and technology) that worked toward a June 1 final report that will serve as a final plan for the NBS-USGS consolidation. Under the flag of USGS, the BRD will continue serving the biological research needs of DOI agencies with the potential for increased funding in fiscal year 1997 to address priority science needs of the DOI land management bureaus. This new initiative would expand research assistance by means of tactical research, inventory, monitoring, mapping, and data support. Combined with a commitment by the National Park Service to provide matching support for NBS NRPP (Natural Resource Protection Program) work, hope for a continued emphasis on a strong science-based approach to land management is foreseeable.

many reasons. In a proactive manner, the park and the NBS Southern Science Center entered into a memorandum of understanding in 1994 to ensure a continuing working relationship between the two organizations and obtain commitments from scientists for their continued park research. "Since our very modest biological research capabilities were changing hands, my desire was to partner with the NBS and to assure the ongoing consultative relationship so important to the future..." Superintendent Wade continued, "My belief is that together we can do better than what we were doing before this relationship began."

The memorandum addressed many park concerns and fears resulting from the transfer of NPS science capabilities to the NBS. The park wished to ensure that a reduction in tactical research assistance would never occur, especially in a hypothetical scenario where its former scientists were assigned to other NBS priorities. Next, both agencies committed to maintain the park's long-term monitoring program. The memorandum assisted in doing that through mutual agreement to cooperate, resource sharing to gain additional support for the program, and information sharing.

## NBS THROUGH THE EYES OF A PARK MANAGER

Superintendent Wade expressed concern that the NBS does not place high enough priority on field stations and (in a prophetic moment) that the NBS would be absorbed into another organization rendering the possibility of more distant ties between the agencies. She believed that field stations have been staffed with devoted scientists, and desired to continue the strong relationship with former NPS colleagues who could provide unbiased, non-advocacy science to park managers. "If the NBS is going to be absorbed into another organization, we must retain our scientists and the wonderful rich reservoir of knowledge that we currently have."

## TOO FOCUSED OR NOT FOCUSED ENOUGH?

One question raised was how parks would sustain funding for park-specific needs if NBS concentrated its scarce resources on global, landscape-scale,

multiagency research. Similarly, NBS must strike a balance and remain flexible enough to deal with tremendously difficult generic issues like air quality. Can NBS flex enough to have a unit located in the middle of the country that serves Shenandoah, Great Smoky Mountains, and the parks of the east coast? Bob Moon declared that for the NBS to be successful it must continue to do tactical research and provide technical assistance, "for NBS that's a given."

## A PLACE-FOCUSED APPROACH

Based in Bandelier National Monument, NBS scientist Craig Allen championed the idea of a place-focused approach where a national park (or public land or natural area) served as a focal point for long- and short-term inventory, monitoring, and research. He quoted the 1994 ombudsman committee report, *Solutions to Problems faced by former NPS Scientists transferred to the NBS* (van Riper 1994), that stated, "Many [scientists] had a long-term tie to a specific park in which their role usually transcended basic research to encompass information transfer, science adviser, program facilitator, and activities fundamental to maintaining long-term integrity of the national park resources and ecosystems." He noted that what held this together was the focus on a place,

the landscape, and the continuity of the relationships between the people and the place.

Dr. Allen stated that a positive aspect about the NPS research program, albeit small in pre-NBS times, was that researchers were on site in the parks working with managers. In these cases, scientists were closely integrated with management objectives. He also suggested that his role at Bandelier spanned a continuum between spending a quarter of his time monitoring, a quarter dealing with management issues including information transfer, a quarter supporting and catalyzing the work of other researchers, and a quarter conducting new research. "I can't think of just chopping and dichotomizing the individual [areas of work emphasis]; it's maybe more like a soil texture triangle, where for any given issue, you're in some interconnected place..." Allen stated. He continued that many scientists in a similar position assist in synthesizing the work of other people and serve as an interface between research and management.

Lending evidence to Wade's earlier comments regarding the commitment and allegiance of a scientist to the "place"

*Continued on page 12*

(i.e., park, monument, natural area), Allen noted that through time, and perhaps by default, he had become "the local expert" on the ecology of not only Bandelier, but also of the larger landscape around the monument. To a degree, each scientist becomes the institutional memory and source person for a variety of information concerning local natural resources. He emphasized that he did not think his situation was unique, because it was not uncommon for many park based researchers to spend a good part of a career in a given park producing similar local expertise.

National Biological Service Director H. Ron Pulliam emphasized his strong belief in the importance of having NBS scientists in the parks, though he did not feel it would be possible in the near future to cover each national park in the country. His rationale for increased focus on parks was the lack of basic information concerning the resources in national parks and monuments. He cited a recent publication by NBS scientists (Stohlgren et al. 1994) that examined the status of biotic inventories in parks. "It really pointed out our fundamental ignorance about park resources. We don't have a reasonable inventory of even the birds, mammals, and vascular plants in the parks, much less the [reptiles and amphibians] and other less charismatic organisms." He noted that there is even less understanding of the changes affecting the biological resources.

As an indication of the NBS commitment to providing science in national parks, Director Pulliam intends to continue implementing the recommendations of the 1994 ombudsman committee report. The report proposed establishing a network of long-term NBS research sites including national parks as focal points, dedicating a portion of NBS funding to deal with NPS research issues, continuing to waive NBS overhead on NPS funded projects, and other park oriented initiatives.

#### RESEARCH GRADE EVALUATION

Dr. Allen brought up one issue that was not addressed in the ombudsman report. He discussed how research grade evaluation status puts pressure on park-based NBS scientists to think more narrowly about their roles. "Within NBS, we could

receive less credit for doing the things the park wants us to do." He spoke of an experience where one NBS scientist was told by the chair of his research grade evaluation panel that the kinds of local interactions with management (information transfer, coordinating research, etc.) were "serving as anchors to a career with otherwise great potential," clearly highlighting the tradeoff between management support and publishing activities. "I think it's a very real problem. There is persistent tension between how you're evaluated under research grade evaluation status (i.e., a publishing record) and the realities of a park-based scientist." Although all would agree that publishing builds scientific credibility, some balance must be made that realizes the realities of a park-based scientist. Some of these concerns are being discussed as part of the current transfer of NBS scientists to USGS.

#### FINAL THOUGHTS

In closing, the panelists called for leaders to ensure that the National Park Service and National Biological Service take active roles in making the partnership work. Charles van Riper suggested that "the parks should take their planning documents down to [the] local NBS office, wherever it may be, and say 'Here's what I need done, do you have anybody that can do this?'" He felt that when the next call for NBS research proposals would come out, those scientists could show an identified research need, and leverage that in a way where one could say, "Look, I'm meeting a client need," thus aiding in getting the project funded. Van Riper insisted that parks use their planning documents and was adamant that the National Park Service not be charged overhead. Park officials express hope that positive trends like this will continue as NBS merges with the USGS.

Perhaps one of the most important points to come out of the discussion was the need to solidify the NBS-NPS partnership. "How do we make visitors aware of the research challenges that directly relate to wise management?" Superintendent Wade asked. She expressed that research programs need more visibility so that the public could take that awareness to their representatives and make them realize that we need more research to

more wisely manage and protect our nation's resources. "NBS needs to become a household word. If we can make a positive connection between the NBS as the organization in parks doing our research, we will have overnight visibility for our research needs and both organizations will benefit."

It is hard to predict what the most appropriate or even practical model is for science in the parks and science-based park management. Prior to the NBS, science in parks was on an upswing through the National Academy of Sciences report, issuance of the NPS-75 Inventory and Monitoring Guideline, and the beginnings of nationwide ecosystem research initiatives like the Global Change Research Program. However, as Bob Moon noted earlier, "Pre-NBS research was not the good old days."

As 1996 progresses with change and uncertainty swirling about us, the relationship between science and the parks has become as dynamic as the changing research needs. However, the need itself remains constant. Often, times of change present the greatest opportunity to reinvent, improve, or create something positive. As the NBS (soon to become the Biological Research Division within USGS) undergoes its transfer to the USGS and the new relationship to the NPS continues to unfold, each agency must assume the responsibility of procuring a sound, science-based management of natural resources in our parks.



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